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AMERICA'S SUPERSECRET EYES IN SPACE

By James Bamford

AN UNEARTHLY ROAR SHATters the quiet of a Florida afternoon. On a launching platform at the Kennedy Space Center, liquid hydrogen and liquid oxygen surge through the thick aluminum veins of the space shuttle Discovery and explode in a 3,200-degree fireball of thrust. Four seconds later, the solid fuel of the two boosters ignites, and the space-plane, as tall as a 12-story building, arches gracefully into the sky.

Forty-five minutes later, all communication to and from the crew of Mission 51-C will suddenly become a seeming jumble of static. For the first time in the history of the American space program, all communication with the astronauts will be hidden in complex codes intelligible only with special unscrambling equipment. The fiery liftoff of Discovery, tentatively scheduled for Jan. 23, will mark the beginning of a new intelligence era. Added to the shuttle's list of customers will be the most secret organization in the American intelligence community, the National Reconnaissance Office (N.R.O.).

For nearly a quarter of a century, the N.R.O. has been responsible for managing the nation's growing fleet of spy satellites — at least one of which will be firmly secured to a pallet in Discovery's cavernous cargo hold. For the same period, America's reconnaissance-satellite program has been hidden under a heavy layer of security classifications and code names, such as Byeman and Top Secret Ruff. Since its establishment on Aug. 25, 1960, the N.R.O. has been an entirely "black" organization: The Federal Government has never admitted that it exists, and its name is officially secret.

"That office is still classified," says Stansfield Turner, the retired admiral who headed the Central Intelligence Agency from 1977 to 1981, and who is writing a book about his tour with the C.I.A. "I can't acknowledge that we have a National Reconnaissance Office — if we do have one."

"That's the primary issue that I'm fighting the C.I.A. on, to get release of my book," Admiral Turner added. "They won't let me talk about satellites, other than as they are used for arms control, and I can't even acknowledge that we use satellites for looking at tanks. . . . In my book, I repeatedly refer to the 'offices in the Pentagon that handle photographic reconnaissance.' "

The problem, he admits, is partly of his own making: "There was a debate in my day about declassifying the N.R.O., and I sided, or eventually sided, or gave in anyway, to pressures not to declassify, and they still have not. Whereas you can talk about the N.S.A." — the National Security Agency, which intercepts communications and breaks foreign codes — "you cannot talk about the N.R.O."

As a result of this continuing secrecy, few people are aware of how increasingly dependent the American intelligence community has become on the country's network of spy satellites. To give a recent example, it was satellite surveillance that produced the famous photos of the crates on the dock of the Soviet Black Sea port of Nikolayev. (That some American officials erred in suspecting that the crates were used for shipping Soviet MIG's to Nicaragua was not the N.R.O.'s doing.) It was the same satellite capability that revealed Libya's failure to abide by its recent promise to France to withdraw its troops from Chad. And if President Reagan's "Star Wars" plan for placing antimissile defenses in space ever moves from research to development, it will be the N.R.O.'s task to provide the eyes that could detect Soviet offensive missile launchings from their very first stages.

The story that enters a new phase next week began 26 years ago, on Jan. 21, 1959, on a launch pad at Vandenberg Air Force Base, 150 miles northwest of Los Angeles. The countdown that day was for the test flight of a large Thor ballistic missile. Packed inside the missile's nose cone was Discoverer, a prototype of the first photographic reconnaissance satellite.

Since June 1956, the United States had been relying on the high-flying U-2 aircraft for overhead photography of the Soviet Union. But by 1959, the Russians had developed missiles capable of reaching the U-2's top altitude of 72,000 feet. The plane's days of safety were numbered. Discoverer was the result of an ambitious operation, shared by the C.I.A. and the Air Force, to develop a satellite that could take over from the U-2. The camera-laden spacecraft would take pictures of the Soviet Union as it orbited high above the earth. The capsule containing the exposed film would then be ejected by the satellite and snared by specially rigged aircraft as it parachuted down over the Pacific Ocean.

THE FIRST TRY WAS A FIASCO; the missile never got off the ground. For the next 19 months the project had a record of complete failures and near misses. But early on the morning of Aug. 18, 1960 — just three and a half months after a U-2 was shot down over Russia — Air Force Capt. Harold E. Mitchell spotted the falling capsule and, on his third try, succeeded in snatching it in the trapezelike rigging that trailed from his aircraft's tail. A week before, another Discoverer capsule had been recovered from the ocean. The two recoveries opened a new frontier for the collection of intelligence, a frontier that has never stopped expanding.

A few days after Discoverer 14 was plucked from the atmosphere, C.I.A. chief Allen Dulles summoned his Deputy Director for Plans, Richard M. Bissell Jr., to his office. It was time, Mr. Dulles said, to formalize the management of the nation's space reconnaissance program. The result of that decision was the secret creation, in 1960, of the N.R.O. The C.I.A. was made responsible for arranging for the

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development of the spy satellites. The Air Force was to provide the launch vehicles, control the launch and recover the film. The N.R.O. would be in overall charge of all spy-satellite missions.

Although the new organization was placed — secretly — under the direction of the Under Secretary of the Air Force, Joseph V. Charyk, the arrangement left a number of Air Force officials bitter. As they saw it, they had already lost much of the aerospace program to the National Aeronautics and Space Administration in 1958; now they were being forced to share another space mission with still another civilian agency. Mr. Charyk managed to complete his tour as N.R.O. director in 1963 without major problems, but the fragile truce was about to end.

Mr. Charyk's successor at the N.R.O. was Brockway McMillan, another Air Force Under Secretary, better known to some as "Breakaway" McMillan. The new director did not like it one bit that the Air Force had virtually no say on what type of spy satellite it sent aloft. At the time, the C.I.A. was primarily interested in taking pictures of large-scale objects and expanses of strategic importance; this entailed the use of satellites capable of photographing broad areas. The Air Force, on the other hand, wanted lower-orbiting satellites, which could produce higher-resolution photographs for close-up, detailed looks at Soviet aircraft and other tactical targets. Mr. McMillan's object became to wrest control of the N.R.O. for the Air Force.

This attempt, however, ran into opposition within the Pentagon itself. Secretary of Defense Robert S. McNamara was afraid that an Air Force in charge of spy satellites would have great advantage over the other services, and that this could lead to slanted information impairing his ability to make independent judgments. For that reason, Mr. McNamara joined forces with the new C.I.A. chief, John A. McCone, against his own Air Force Under Secretary.

After more than two years of bitter wrangling, the N.R.O. was placed under the overall supervision of the C.I.A. director and the Secretary of Defense. These officials exercised their authority through a new body, the National Reconnaissance Executive Committee, or Excom. Mr. McMillan resigned. His successor, Alexander H. Flax, former technical director of the Cornell Aeronautical Laboratory, was more interested in the frontiers of scientific knowledge than in the boundaries of his office. The issue of control was resolved.

All the same, the next four years were not easy ones, according to James Q. Reber, a C.I.A. expert on satellite surveillance who took over as the N.R.O.'s deputy director. "You can readily sense how you've got 20 or 30 military officers, you have me in there as deputy, you have an Air Force Assistant Secretary as my boss," Mr. Reber said in a recent interview. "And though I am seconded here, I am essentially still a C.I.A. person. You can surmise both my position and theirs."

The C.I.A., he explained, wanted him to push more aggressively for its preferred programs: "What they were saying was, 'You haven't served our interests.' And I said, 'I didn't assume that was my job. My job is to serve the interests of the N.R.O.' So you see that the view wasn't necessarily unified as to what I was supposed to do."

Over the years, the N.R.O. has conformed closely to the original blueprint, and interagency competition over target selection has remained vigorous. The current wearer of the "black hat" is Air Force Under Secretary Edward C. Aldridge Jr., appointed by the President in 1981. An aeronautical engineer who has spent most of his career alternating between government and private industry, Mr. Aldridge spends half his time on N.R.O. matters and half on his "white" duties. Most of the day-to-day work is carried out behind a set of yellow double-doors at the Pentagon.

The doors, equipped with a combination lock and a cipher lock, are designated only by a number, 4C-956, and two names — Col. Paul Foley and Jimmie D. Hill. Both have official Defense Department titles as covers, but Colonel Foley is the N.R.O's chief of staff and Mr. Hill is its longtime budget chief. The doors lead to a hallway lined with offices where, according to a former top intelligence official, "a bunch of bloody serious technocrats" operate the current generation of spy satellites and plan for the next generation.

Another N.R.O. center is situated on the West Coast, where most of the reconnaissance satellites are built and launched. There, the agency operates from the Air Force Space Division, near Los Angeles, under the cover name of the Special Projects Office.

The N.R.O. still reports to the Excom, which is said to have been enlarged by representatives of the Navy and other groups. Principal authority over the program rests with the Secretary of Defense. Assigning coverage and targets is the responsibility of the C.I.A. director, and he does this through the Committee on Imagery Requirements and Exploitation, or Comirex, made up of representatives of the N.R.O.'s various customers. The committee reviews requests from the C.I.A., the N.S.A., the Defense Intelligence Agency (D.I.A.), the military services and the State Department, and decides which targets will be approved and what priority each will have.

A list of targets and priorities then goes to the N.R.O. The agency calculates such things as the orbital parameters, which determine when and where to turn the cameras on and off, and this information is transmitted to the Satellite Control Facility in Sunnyvale, Calif. The "Blue Cube," as this facility is known, transmits the signals up to the spy satellites from any one of its eight tracking stations around the world.

Another copy of the targets and priorities goes to a tall, nearly windowless concrete building in the Washington Navy Yard. This is the National Photographic Interpretation Center (N.P.I.C.), the Fotomat of the intelligence community. It is here that the film capsules come after their long drop from the satellites and their mid-air recovery near Hawaii. The film spools, some weighing hundreds of pounds, are moved with grappling hooks onto long conveyor belts for processing. Once developed, the films are projected on the screens of photo-intelligence specialists, who search for the targets assigned by Comirex. If an interesting new cannon should appear on a tank, the analyst pushes a button and a computerized lens zooms in to enlarge the detail. To find out the length of the gun, a cursor is run along the barrel, and the exact dimensions flash onto the screen.

The committee's choice of targets, says Arthur C. Lundahl, founder and former director of the National Photographic Interpretation Center, is based on "national security needs, not departmental needs," and this can lead to some heated argument. As Mr. Lundahl puts it: "The Navy could whine in the wings, 'We've got to know all about this submarine at this or that particular place.' And I said, 'Listen, you have to make your case, you have to set it all down on paper as to why it's important, and they would have to lay side by side with other competition for coverage, and if indeed your case is right, it will get covered first. If it isn't right, it might get covered later or it might never get covered at all.' "

THE N.R.O.'S ORGANIzational chart has remained fairly constant over the years, but the same cannot be said of its technology. In the years since Discoverer, the revolution in overhead espionage has been remarkable — and prodigiously expensive. The N.R.O. in recent years has had "the largest budget of any intelligence agency," according to a June 1975 report of the Commission on the Organization of the Government for the Conduct of Foreign Policy. (The commission, set up by Congress, did not, of course, identify the N.R.O. by name.) According to Anthony Kenden, a British aerospace writer who follows the American military satellite program, the United States entered 1983 with something in the neighborhood of 60 military satellites in operational use.

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"They ranged," said Mr. Kenden, "from a weather satellite that had been in space for just 11 days to a navigation satellite that had been in daily use for over 15 years."

The United States still relies on high-flying reconnaissance planes, such as the U-2 and the SR-71, when pictures are needed in a hurry and when a satellite is unavailable or hampered by cloud cover. Originally, the N.R.O. had responsibility for these aircraft, as well as for satellites. But in 1969 it turned over all control of spy planes to the Strategic Air Command.

Currently, the N.R.O.'s photo reconnaissance program, code-named Keyhole, consists of three separate satellite systems. The largest and probably most sophisticated is the KH-11, the first of which was launched into orbit on Dec. 19, 1976, after more than five years of development by TRW Inc., the C.I.A. and the N.R.O. Six stories tall, weighing in at 15 tons and equipped with a televisionlike photo-transmission system, the KH-11 is the ultimate in state-of-the-art espionage.

Orbiting the earth every 92 minutes at an altitude of between 170 and 320 miles, the satellite's signals are first transmitted to another satellite. The pictures are then retransmitted down to analysts at the Mission Ground Site, a large, windowless, two-story concrete building at Fort Belvoir, near Washington, with the cover name of Defense Communications Electronics Evaluation and Testing Activity. For the first time, analysts can order up detailed views of target areas virtually instantly. "You can call up the KH-11," says one person familiar with the system, "and when it comes up on its geometry to the target area, you can get a photo and have it back down here, printed out, in an hour, and have it over to the White House."

The advantage of speed, however, means some sacrifice of resolution. When clarity of image is the main consideration, it is a job for the KH-9, or Big Bird satellite, which, like the early Discoverer, returns the exposed film to the earth in recoverable pods. About the same weight as the KH-11, though some 10 feet shorter, Big Bird has been sent into orbit regularly since June 15, 1971. Both the KH-11 and Big Bird travel in a north-south polar orbit, which takes them over virtually every place on earth. A KH-11 can frequently remain operational for several years, but the life of a Big Bird is usually about eight or nine months.

When extremely good photography is needed, the job is given to yet another satellite, the KH-8. Unlike the Big Bird, which orbits at an altitude of between 103 and 167 miles and is designed for looking at the big picture, the KH-8 can come down as low as 70 miles for a close look. Objects on the ground as small as six inches across can be distinguished in photos from this satellite. Originally, the lifetime of the KH-8 was measured in weeks. Now it frequently stays aloft for three or four months before it runs out of fuel and film. Once that happens, a rocket on the satellite is fired, slowing down the spacecraft and sending it crashing into the atmosphere, where it burns up.

As in most areas of space technology, the United States has long had a significant lead over the Soviet Union in photo reconnaissance satellites. Lacking a "real-time" video-transmission satellite like the KH-11, the Russians have had to rely on satellites that return the film in capsules. Thus, the Soviet Union was forced to launch 27 photo satellites in 1983, compared to two for the United States. Recently, however, according to a Washington expert, the Russians sent up a reconnaissance satellite that has been up for more than four months. "As far as I know, it is still up there and still functioning," the official said. This may be the long-awaited Soviet version of the KH-11.

Whether a Soviet gain in reconnaissance technology is a loss for the United States is an interesting question. The United States and the Soviet Union openly accept each other's use of reconnaissance satellites as an essential element of arms control. Grudgingly, both sides also accept each other's use of satellites for pure espionage. Nevertheless, says a senior official of the Reagan Administration, the Russians frequently use camouflage to hide their weapons, and conduct some of their more sensitive outdoor activities at night to frustrate the American satellites in space. It may be assumed that the American military takes similar precautions.

LAST YEAR WAS AN unusually active one for the N.R.O. For the first time in 10 years, two KH-8 close-look satellites were sent into orbit within a period of little more than four months. During much of the summer and fall, all three types of satellite were in orbit and operational. Yet, at this time of increasing reliance on space photography, the N.R.O., according to several sources, has had to cut back on the production of the KH-8 and Big Bird satellites. The problem is massive cost overruns on the KH-11. Because of that, according to officials, the inventory of the other two satellites is becoming dangerously low.

Even with a full complement of Keyhole satellites, much is missed because of cloud cover and the darkness of night. For example, the Russians had been at work for more than a year on a large new radar installation at Abalakova, in Siberia, before it was spotted by an American satellite. Another large radar complex, this one at Pechora, in northern Russia, took more than 18 months to discover and photograph. "There have been times when I've wanted to see Moscow with a satellite," says Daniel Graham, former head of the Defense Intelligence Agency. "I wanted a picture of Moscow for four months, and no picture. Why? Because she went by in the dark, she went by when there's clouds." The East-West deadlock over medium-range missiles in Europe goes back to the deployment of new Soviet SS-20 missiles in the 1970's, yet Gen. Richard G. Stilwell, Deputy Under Secretary of Defense for Policy, told a recent gathering of former intelligence officers that he had "never seen a good picture of an SS-20 out of canister."

Because of the cost overruns, reported to be totaling as much as $1 billion, the photo-transmitting KH-11 has its critics. "Nobody looks at the money very closely, and those guys spend money like drunken sailors," said a senior Administration official closely associated with the N.R.O. "The KH-11 is a good example. They rushed into that and sold everybody a bill of goods. And then when they came to deliver, it cost 50 times what they said, and it didn't produce half of what they said it would. You've diluted the whole recon capability. You're spending all your money on a Rolls-Royce instead of buying a couple of hundred Bronco II's, or Jeeps, or whatever."

Some say that Congress shares the blame for not exercising sufficient oversight through the Senate and House committees on intelligence and appropriations. One former senior N.R.O. official who agreed with this criticism told of his experience in testifying before a Congressional committee: "So here we are, with detail after detail, and they say, 'Forget about that, just give us the big picture. Tell me what this thing here is supposed to do.' And we say, 'Well, you know, it's going to go over there, and it's going to do the following thing.' And they say, 'Well, that sounds terrific, what do you need?' And we say, 'Well, you know, we want to build two of these and they cost about a hundred million each, or whatever.' And they say, 'Well, you guys have been running a good program, good luck to you.' "

Another consequence of the overruns affects the program's future development. The United States, according to senior Administration sources, is working on a radar satellite designed to orbit at an altitude of 22,300 miles. The satellite, at that height, would travel at the same speed as the earth, and, therefore, would appear to be parked over a single spot. Moreover, the spacecraft would see through cloud cover and other weather conditions, and would transmit what it saw instantaneously. Thus, it would be able to provide, for the first time, continuous, high-resolution, photolike coverage of vast areas of the

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Soviet Union and China. Yet, because of the cost overruns on the KH-11, this project has suffered from continued delays.

Many in Washington are convinced that the problems of overruns and oversight have been magnified by the intense secrecy that has surrounded the N.R.O. since the day it was born. Asked about the reason for such secrecy, a C.I.A. official said: "You know, I can't give you any reason behind it, except that it's part and parcel of the whole satellite question. The decision has been made to maintain the classification, and that's all we can say."

Clearly, one of the main reasons for the secrecy is rooted in a broad principle: To acknowledge the N.R.O. would be to acknowledge the existence of the spy-satellite program, and that the intelligence community has never been willing to do. To its critics, this policy seems illogical. In the early days, when satellite reconnaissance was new and not generally known, there may have been valid reasons for keeping this collection method under heavy wraps. But, the critics say, such is not the case today.

There have been times in the past when the policy seemed on the verge of change. Addressing a gathering at Cape Canaveral on Oct. 1, 1978, President Jimmy Carter acknowledged that the United States uses satellites for photographic intelligence. Except for an offhand remark by President Lyndon B. Johnson in the late 1960's, it was the first time an incumbent President had ever acknowledged the use of spy satellites. Yet Mr. Carter's remark — the result of a decision, according to a senior intelligence official, that "there would be more gained than lost by the acknowledgement" — has remained an isolated instance. Under President Reagan, the secrecy is as tight as ever.

The irony is that the Soviet security and intelligence organization K.G.B. probably knows more about America's spy-satellite operations than all but the few most highly cleared people in the United States. The reason for this is an abominable track record in security on the part of the C.I.A. and the satellite intelligence community as a whole.

Within little more than a year after the first KH-11 was launched, the Russians had a complete copy of the satellite's technical manual. It was sold to them in February 1978, for $3,000, by William P. Kampiles, a former C.I.A. employee. Kampiles had walked out of the agency headquarters in Langley, Va., with the manual with less trouble than he would have had sneaking "Gone with the Wind" from the public library. He was later found guilty and sentenced to 40 years, but the damage, according to testimony at the trial, was enormous. To the Russians, the manual was invaluable, and left little to the imagination.

As if losing one copy of the KH-11 manual was not bad enough, it was revealed at the trial that, out of 350 copies printed, the C.I.A. was inexplicably missing 16 additional manuals — including one signed out to the director. As far as is known, the C.I.A. has never been able to find out what happened to these copies. According to Jeffrey Richelson, an assistant professor at the American University in Washington, the Russians may have gotten additional details on the satellite even before they received the manual. In a recent paper in the Journal of Strategic Studies, Mr. Richelson says that Christopher Boyce, a former employee of TRW convicted in 1977 for selling satellite secrets, gave the Russians 5 to 10 typed pages dealing with a satellite that closely resembled the KH-11.

One view is that the Government's unwillingness to declassify the N.R.O.'s existence and some of its work has to do less with national security than with bureaucratic turf. Daniel Graham, the former D.I.A. director, sees it as follows: "Resistance to change came from the Central Intelligence Agency, and it came on bureaucratic grounds. So long as all of this photography was in a category controlled by the C.I.A., they had the upper hand, and they could say who got it, who didn't get it, and they could play games."

Lately, the issue of openness versus secrecy has seemed to be coming to a head. According to a 1983 study by the General Accounting Office, NASA has been objecting to the elaborate security measures that have been introduced for shuttle launchings over the last few years. NASA's argument is that these new rules are giving the military too much control over shuttle operations — an objection that surfaced on front pages of newspapers as the launching scheduled for next week approached.

The N.R.O., on the other hand, has long been concerned over the shuttle's reliability; the coming launching was postponed three times in the last 15 months because of technical problems. As a result, the Air Force recently received $15 million from Congress to develop expendable rockets for launching satellites originally intended for the shuttle. This program is presented as a complement to the shuttle's missions. But NASA, which will need a good quota of military missions to help pay for the shuttle in the years ahead, is afraid the Air Force may want to go back to expendable rockets as its primary launching technique.

WHATEVER THE outcome of the debate over secrecy, the biggest change in the year ahead will come from the space shuttle. Home for Discovery will be a city of giant concrete monoliths and towering steel platforms north of Los Angeles. This is "Slick Six" — the Vandenberg Space Launch Complex, or SLC-6, built specifically for the shuttle's military missions.

Eight to 10 times a year, the shuttle will rocket into space with reconnaissance and other types of military satellites. Once up, the crew may repair a malfunctioning "bird" or, should that fail, bring it back to earth. At other times, the shuttle will act as a space tanker, refueling a KH-11 with another year's supply of hydrazine, or as a supply ship, reloading the film on a close-look KH-8. Finally, the shuttle may become an actual spy plane.

For years, the N.R.O. has considered using the shuttle for intelligence collection as a sort of cross between a high-flying SR-71 reconnaissance aircraft and a low-flying close-look satellite. The shuttle could be launched on fairly short notice, maneuvered to a target area and made to descend, at least briefly, to as low as 70 miles. Several high-resolution cameras could then be aimed downward from the cargo hold, and the pictures could be relayed directly to the Mission Ground Site at Fort Belvoir. Other film spools, with higher-resolution photos, could return with the shuttle.

The feasibility of such a mission was demonstrated last October, when the shuttle's Mission 41-G produced photos of startling clarity with its experimental cameras, including one that could "see" through clouds. The shuttle's future as a spy plane will be tested even more rigorously by Mission 51-C next week.

Still further down the space road is a new signals-intelligence, or Sigint, satellite. Even more secret than photo satellites, the "ferrets," as they are called, eavesdrop on communications and electronic signals. This includes everything from radar to long-distance telephone calls to the high-pitched whistle of telemetry from a missile test. One of the most important Sigint satellites is Rhyolite, first launched operationally in the early 1970's. From its "parked" orbit high above the earth, the satellite is able to pick up telemetry and communications traffic from both the Soviet Union and China. This is then relayed to the N.S.A.

In 1975, there was a major debate within the N.R.O. and the Excom on whether to develop a follow-up system to Rhyolite. An experimental satellite, Argus, with a 140-foot-wide antenna — twice as big as Rhyolite's — was sent into orbit in 1975. But the project was eventually killed by a budget-conscious House committee. As a result, an apparently scaled-down copy, Chalet, was approved and orbited in 1978, 1979 and 1981. The next generation communications satellite, a giant known as Aquacade, was designed to take advantage of the roomy shuttle. And it is this spacecraft, or some modified version, that, in all likelihood, now sits behind the clamshell doors of Discovery, waiting to open the newest frontier in espionage. ■

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